Claims

1.   In a computer network having a client on a first computer and a media server for storing data on a second computer, a method comprising the steps of:

providing a wire protocol that facilitates creation of connections between the media server and the client;

using the wire protocol to create a control connection between the media server and the client to facilitate exchange of control information between the media server and the client; and

using the wire protocol to create a data connection between the media server and the client to facilitate the exchange of data between the media server and the client at a rate substantially equal to a rate at which the client consumes the data.

2.   The method of claim 1 wherein the step of providing the wire protocol includes providing formats for messages in the wire protocol.

3.   The method of claim 1, further comprising the step of using the control connection to exchange control information between the media server and the client.

4.   The method of claim 1 wherein the media server includes multiple data servers and wherein the step of using the wire protocol to create the data connection includes creating a multipoint-to-point connection between the data servers and the client.

5.   The method of claim 1, further comprising the step of using the data connection to transfer data of multiple media between the media server and the client.

6.   The method of claim 1, further comprising the step of using the wire protocol to cause data to read from the media server and forwarded to the client over the data connection.

7.   The method of claim 1 wherein the media server includes storage and wherein the method further comprises the step of using the wire protocol to cause data from the client to be passed over the data connection to the media server to be written on the storage at the media server.

8.   The method of claim 1 wherein the step of using the wire protocol to create a control connection includes creating a bidirectional control connection that allows control information to flow from the client to the media server and from the media server to the client.

9.   The method of claim 1, further comprising the steps of:
sending a request message for service over the control connection from the client to the media server; and
asynchronously processing the request message at the media server.

10.   The method of claim 9, further comprising the step of asynchronously generating at the media server and sending over the control connection to the client a response message that responds to the request message.

11.   In a distributed system having a media server on a first computer for supplying media output and a client on a second computer for requesting the media output from the media server, a method of interconnecting the media server and the client, comprising the steps of:
creating a control connection for enabling control information to pass between the media server and the client; and
creating a data funnel connection between the media server and the client for data to transferred between the media server and the client at a rate substantially equal to a rate at which the client consumes data.

12.   The method of claim 11 wherein the media server includes multiple data servers and wherein the data funnel connection is a multipoint-to-point connection that connects at least some of the data servers with the client.

13.   The method of claim 11 wherein the media output includes multiple media.

14.   The method of claim 11 wherein the step of creating the control connection includes passing a message from the client to the media server requesting the control connection.

15. The method of claim 11 wherein the step of creating the data funnel connection includes passing a message from the client to the media server requesting the data funnel connection.

16. The method of claim 11 wherein the control connection is bidirectional.

17. The method of claim 11 wherein the data funnel connection is bidirectional.

18. The method of claim 11, further comprising the steps of:

sending multiple requests for service from the client over the control connection to the media server such that the multiple requests are concurrently outstanding; and

asynchronously servicing the multiple requests for service at the media server.

19. In a distributed environment that includes a media server for providing multiple media output to a client wherein said client is connected to the media server via a network connection, a method comprising the steps of:

sending a first request for service from the client to the media server wherein said first request includes a first identifier that uniquely identifies the first request;

sending a second request for service from the client to the media server wherein said second request includes a second identifier that uniquely identifies the second request and wherein the second identifier differs from the first identifier;

at the media server, asynchronously servicing the first request and returning an acknowledgment to the client that includes the first identifier; and

at the media server, asynchronously servicing the second request and returning an acknowledgment to the client that includes the second identifier.

20. In a computer network where a media server is connected to a client via a network connection, a method of decreasing network traffic comprising the steps of:

batching multiple messages into a single message;

sending the single message between the client and the media server; and

unbatching the multiple messages and processing each of the multiple messages.

21.   The method of claim 20 wherein the step of batching multiple messages includes the steps of:

specifying a length for the single message in the single message; and

specifying a length of each of the multiple messages in the single message.

22.   The method of claim 21 wherein the step of unbatching the multiple messages uses the specified length of the multiple messages to locate the multiple messages within the single message.

23.   In a distributed system having a media server for storing files holding data of multiple media, a client for requesting service from the media server, a control connection between the media server and the client for passing control information and a data connection for passing data between the media server and the client, a method comprising the steps of:

sending a read request message from the client to the media server over the control connection wherein said read request message requests that data in a file of multiple media data stored at the media server be read and input to the client;

sending a read request acknowledgment message from the media server to the client over the control connection to acknowledge the read request message; and

forwarding the requested data from the media server to the client over the data connection at a rate that is substantially equal to the rate at which the client consumes the data.

24.   The method of claim 23 wherein the requested data is a single fixed size block of data.

25.   The method of claim 23 wherein the requested data is an entire file of data.

26.   In a distributed system having a media server for storing files holding data of multiple media, a client for requesting service from the media server, a control connection between the media server and the client for passing control information between the media server and the client and a data connection for passing data between the media server and the client, a method comprising the steps of:

sending a write request message from the client to the media server over the control connection, said write request message requesting that data from the client be written into a file at the media server;

sending a write request acknowledgment message from the media server to the client over the control connection to acknowledge the write request message;

forwarding the data to be written from the client to the media server over the data connection; and

writing the forwarded data into the file at the media server.

27.   In a distributed system having a media server storing files holding data of multiple media, a computer system comprising:

a control connection generator for creating a bidirectional control connection between the media server and the computer system to enable control information to be passed between the media server and the computer system; and

a data connection generator for creating a bidirectional data connection between the media server and the computer system to enable data to be passed between the media server and the computer system.

28.   The computer system of claim 27, further comprising a request generator for generating requests for service from the media server that are passed over the control connection wherein each request includes a unique identifier.   :

29.   The computer system of claim 28 wherein the request generator further comprises a read request generator for generating requests to read data from the files of the media server so that the read data is output over the data connection to the computer system.

30.   The computer system of claim 28 wherein the request generator further comprises a write generator for generating requests to write data from the computer system to the media server so that the data written is forwarded over the data connection to the media server and written into a file at the media server.

31.   The computer system of claim 27, further comprising a message generator for generating a message that holds multiple messages for transmission over the control connection to the media server.